WHAT IS CLAIMED IS:

1   1.   A method for recognizing a change in a rate of data transmission in a

2   communication system which transmits data at a rate which is selected from a plurality

3   of rates, the communication system being capable of conducting several communication

4   sessions simultaneously on a single carrier frequency, comprising:

5   orthogonally encoding the data in a plurality of packets, each packet having

6   a plurality of symbols having signal points in a field, the signal points of consecutively

7   transmitted symbols being correlated unless the rate is changed, the data being further

8   encoded such that only orthogonal descendants of a selected maximum rate code are used

9   for one of the transmitters communicating with a selected receiver,

10   transmitting the encoded data to the selected receiver, and orthogonally

11   decoding the encoded data,

12   identifying the signal points of consecutively transmitted symbols, and

13   recognizing a change in the rate of data transmission when the signal points

14   of consecutively transmitted symbols are not correlated.

1   2.   A method for recognizing a change in a rate of data transmission in a

2   communication system which transmits data at a rate which is selected from a plurality

3   of rates, the communication system being capable of conducting several communication

4   sessions simultaneously on a single carrier frequency, comprising the steps of:

5   orthogonally encoding the data in a plurality of packets, each packet having

6   a plurality of symbols having signal points in a field, the signal points of consecutively

7   transmitted symbols being correlated unless the rate is changed, the data being further

8   encoded such that only orthogonal descendants of a selected maximum rate code are used

9   for one of the transmitters communicating with a selected receiver,

10   transmitting the encoded data to the selected receiver, and orthogonally

11   decoding the encoded data,

12   identifying the signal points of consecutively transmitted symbols, and

13   recognizing a change in the rate of data transmission when the signal points

14   of consecutively transmitted symbols are not correlated.

1   3.   A signal for use in a data communication system having at least one

2   transmitting station and at least one receiving station, the signal comprising a plurality of

3   data packets, each said data packet having a plurality of symbols, a number of symbols

4   in each said data packet being selected from one of several numbers of symbols,

5   each said symbol having signal points in selected positions in a field,

6   consecutively transmitted signal points being correlated in said field unless

7   said number of signal points in said data packets changes, consecutively transmitted

8   signal points which are not correlated in said field indicating that said number of signal

9   points in said data packets has changed.

10   4.   A communication station comprising a receiver, a transmitter and at least

11   one antenna, including:

12   means   for   orthogonally   decoding   data   received   from   another

13   communication station, the data having been encoded in a plurality of packets, each

14   packet having a plurality of symbol points in a field, the signal points of consecutively

15   transmitted symbols being correlated unless the rate is changed, the data having been

16   further encoded such that only orthogonal descendants of a selected maximum rate code

17   are used for communications with the communication station, and

18   means for identifying the signal points of consecutively transmitted symbols

19   in the decoded data and recognizing a change in the rate of data transmission when the

20   signal points of consecutively transmitted signal points are not correlated.

1   5.   The communication station of claim 4 wherein the receiver decodes the data

2   at a first symbol rate, and when a symbol rate change is recognized, the first symbol rate

3   is increased to a new symbol rate and the data is reprocessed to determine whether the

4   new symbol rate is the current symbol rate of the data.

1   6.   The communication station of claim 5, wherein if it is determined that the

2   new symbol rate is not the current symbol rate of the data, the new symbol rate is

3   decreased and the data is reprocessed to determine whether the decreased new symbol

4   rate is the current symbol rate of the data.

1   7.   The communication station of claim 4, wherein (a) two consecutive

2   symbols ρ_t and ρ_{t+1} are decoded at a first symbol rated when the data is decoded, (b) if

3   both symbols ρ_t and ρ_{t+1} are considered valid, both symbols ρ_t and ρ_{t+1} are decoded to

4   determine whether they are correlated; (c) if the symbols ρ_t and ρ_{t+1} are not correlated,

5   then the first symbol ρ_t is output and the symbols ρ_{t+1} and a following symbol ρ_{t+2} are

6   decoded; and (d) if both symbols ρ_{t+1} and ρ_{t+2} are considered valid, designating the

7   symbols ρ_{t+1} and ρ_{t+2} as the symbols ρ_t and ρ_{t+1} and repeating steps (b), (c) and (d), unless

8   consecutive symbols are correlated.

1   8.   The communication station of claim 7 wherein (e) if the symbols ρ_t and ρ

2     $_{t+1}$ are correlated, then the first symbol rate q is doubled so that ρ_t and ρ_{t+1} are decoded as

3   a single symbol ρ_t' and a second symbol ρ_{t+1} based on the symbol rate 2q is decoded; if

4   both symbols ρ'_t and ρ'_{t+1} are valid, then designating the repeating steps (b), (c) and (d).

1   9.   The communication station of claim 7, wherein if the symbol ρ_{t+1} is

2   considered valid and the symbol ρ_{t+2} is considered invalid in step (d), then the symbol ρ_{t+1}

3   is designated ρ_t and is output, the first symbol rate q is reduced to q/2 and a new symbols

4   ρ_{t+1}' and ρ_{t+2}' are computed from ρ_{t+2}, ρ_{t+1}' and ρ_{t+2}' are decoded, and processed further

5   depending on whether ρ_{t+1}' and ρ_{t+2}' are valid or invalid.

1   10.   The communication station of claim 7, wherein if the symbol ρ_{t+1} is

2   considered invalid in step (d), then the first symbol rate q is reduced to q/2 and ρ_t is

3   decoded as ρ_t' and ρ_{t+1}', ρ_t' and ρ_{t+1}' are checked, and are processed further depending on

4   whether they are valid or invalid.

1   11.   A communication station comprising a receiver, a transmitter and at least

2   one antenna, including:

3   a decoder which orthogonally decodes data received from another

4   communication station, the data having been encoded in a plurality of packets, each

5   packet having a plurality of symbol points in a field, the signal points of consecutively

6   transmitted symbols being correlated unless the rate is changed, the data having been

7   further encoded such that only orthogonal descendants of a selected maximum rate code

8   are used for communications with the communication station, and

9   a detector which identifies the signal points of consecutively transmitted

10   symbols in the decoded data and recognizes a change in the rate of data transmission

11   when the signal points of consecutively transmitted signal points are not correlated.

1   12.   The communication station of claim 11 wherein the receiver decodes the

2   data at a first symbol rate, and when a symbol rate change is recognized, the first symbol

3   rate is increased to a new symbol rate and the data is reprocessed to determine whether

4   the new symbol rate is the current symbol rate of the data.

1   13.   The communication station of claim 12, wherein if it is determined that the

2   new symbol rate is not the current symbol rate of the data, the new symbol rate is

3   decreased and the data is reprocessed to determine whether the decreased new symbol

4   rate is the current symbol rate of the data.

1   14.   The communication station of claim 11, wherein (a) two consecutive

2   symbols ρ_t and ρ_{t+1} are decoded at a first symbol rated when the data is decoded, (b) if

3   both symbols ρ_t and ρ_{t+1} are considered valid, both symbols ρ_t and ρ_{t+1} are decoded to

4   determine whether they are correlated; (c) if the symbols ρ_t and ρ_{t+1} are not correlated,

5   then the first symbol ρ_t is output and the symbols ρ_{t+1} and a following symbol ρ_{t+2} are

6   decoded; and (d) if both symbols ρ_{t+1} and ρ_{t+2} are considered valid, designating the

7   symbols ρ_{t+1} and ρ_{t+2} as the symbols ρ_t and ρ_{t+1} and repeating steps (b), (c) and (d), unless

8   consecutive symbols are correlated.

1   15.   The communication station of claim 14 wherein (e) if the symbols ρ_t and

2   ρ_{t+1} are correlated, then the first symbol rate q is doubled so that ρ_t and ρ_{t+1} are decoded

3   as a single symbol ρ_t' and a second symbol ρ_{t+1} based on the symbol rate 2q is decoded;

4   if both symbols ρ'_t and ρ'_{t+1} are valid, then designating the repeating steps (b), (c) and (d).

1   16.   The communication station of claim 14, wherein if the symbol ρ_{t+1} is

2   considered valid and the symbol ρ_{t+2} is considered invalid in step (d), then the symbol ρ_{t+1}

3   is designated ρ_t and is output, the first symbol rate q is reduced to q/2 and a new symbols

4   ρ_{t+1}' and ρ_{t+2}' are computed from ρ_{t+2}, ρ_{t+1}' and ρ_{t+2}' are decoded, and processed further

5   depending on whether ρ_{t+1}' and ρ_{t+2}' are valid or invalid.

1   17.   The communication station of claim 14, wherein if the symbol ρ_{t+1} is

2   considered invalid in step (d), then the first symbol rate q is reduced to q/2 and ρ_t is

3   decoded as ρ_t' and ρ_{t+1}', ρ_t' and ρ_{t+1}' are checked, and are processed further depending on

4   whether they are valid or invalid.